Claims

1. A system for implementing prepaid data services in a mobile communication network, comprising a Radio Network (RN), a Packet Data Service Node (PDSN), a Home Authentication Authorization and Accounting (HAAA) server, a Prepaid Server (PPS)/Content Provider Gateway (CP GW), a Mobile Switching Center (MSC) and a Service Control Point (SCP), the RN further comprising a Base Station Controller (BSC)/ Base Transceiver Station (BTS) and a Packet Control Function (PCF) module for data services, the BSC/BTS being connected to both the MSC and the PCF module, the MSC being connected to the SCP by means of a No.7 signaling network, the PCF module being connected to the PDSN, the PDSN being connected to the HAAA via an IP network and the HAAA being connected to the PPS/CP GW, which is characterized in that this system further comprises a Data service Access Control Point (DACP) for fulfilling price confirmation function and fee application function for data services, the DACP being connected to both the PPS/CP GW and the SCP.

2. The system according to claim 1, which is characterized in that, the DACP comprises a communication module used for communicating with the SCP so as to implement fee application function; a service analyzing and processing module, a database/file management module and a database server module which are connected in sequence and used for implementing price confirmation function for data services together; and a core module used for controlling the above-mentioned modules to cooperate with one another, the communication module, the service analyzing and processing module and the database/file management module being connected to the core module respectively.

3. The system according to claim 2, which is characterized in that, the DACP further comprises a monitoring module used for monitoring the operations of the communication module, the core module and the service analyzing and processing module; a timing module used for sending timing messages so as to trigger the DACP to implement corresponding functions; and a user interface module for providing the DACP with an interface for system coordination and maintenance, both the timing module and the user interface module being connected to the communication module.

4. The system according to claim 1, which is characterized in that, the Transmission

Control Protocol/Internet Protocol (TCP/IP) is adopted for communications between the DACP and the SCP as well as those between the DACP and the PPS/CP GW.

5. A method for implementing prepaid data services in a mobile communication network, the communication network comprising a SCP storing account information of subscribers as well as a PDSN, a HAAA and a PPS/CP GW which cooperate to fulfill data service access and charging, the method comprising:

a. disposing, between the PPS/CP GW and the SCP, a DACP for fulfilling price confirmation function and fee application function for data services; and

b. after the PDSN receives a request message for data service utilization by a prepaid service subscriber, by means of interaction among the HAAA, the PPS/CP GW, the DACP and the SCP, the SCP deducting fees from the account of the prepaid service subscriber, and the PDSN controlling data service utilization of the subscriber according to the fees deducted by the SCP.

6. The method according to claim 5, which is characterized in that, the interaction comprises:

b1. after receiving a charging request message from the PDSN, the HAAA sending a charging request message for requesting fee distribution to the DACP via the PPS/CP GW, the DACP sending a fee request message to the SCP; and

b2. after receiving a fee request response message containing information about the distributed fee from the SCP, the DACP converting the information about the distributed fees by the SCP into information for PDSN to control data service utilization of the subscriber, and then sending a charging request response message, which contains the information for PDSN to control data service utilization of the subscriber, to the PDSN via the PPS/CP GW and the HAAA.

7. The method according to claim 6, which is characterized in that, the method further comprises the following steps between steps b1 and b2:

the SCP judging whether the requested fees can be distributed from a prepaid account of the subscriber, if so, executing step b2; otherwise, returning a response message indicating failure in fee distribution to the DACP, the DACP returning a response message indicating failure in fee distribution to the PDSN via the PPS/CP GW and the HAAA, the PDSN refusing data service utilization of the subscriber or terminating the data service currently used by the subscriber, and then ending the current procedure.

8. The method according to claim 6, which is characterized in that, the information for PDSN to control data service utilization of the subscriber is time period information or flow quantity information, the charging request message in step b1 further comprising charging manner information which indicates either time period or flow quantity will be used to control the subscriber to utilize data services, the DACP converting the distributed fees into time period or flow quantity according to the charging manner information, and the charging request response message further comprising the charging manner information.

9. The method according to claim 8, which is characterized in that the method further comprises:

after receiving information indicating the subscriber has terminated data service utilization, the PDSN sending a charging request information containing information indicating the subscriber's termination and the used time period/flow quantity information to the HAAA, the HAAA sending a charging request message containing used time period/flow quantity information to the DACP via the PPS/CP GW, the DACP converting the unused time period/flow quantity into fee information and then sending a fee return message containing the fee information to the SCP; and

the SCP returning the fees to the prepaid account of the subscriber, sending a fee return response message indicating successful fee return to the DACP, and then the DACP returning a charging request response message indicating successful fee return to the PDSN via the PPS/CP GW and the HAAA.

10. The method according to claim 6, which is characterized in that, when the required fees of the data service utilization by the subscriber are close to the distributed fees, the PDSN sending a charging request message to the HAAA again so as to request fees for the next data service utilization.

11. The method according to claim 6, which is characterized in that, the charging request message, the charging request response message, the fee request message and the fee request response message contain at least an information identifier, a mobile terminal number, an IP address of the PPS/CP GW server and a serial number of the PPS/CP GW server.